

States, 3rd, 19th, 21st, 25th; Eastern Gulf States, 3rd, 5th, 7th, 11th, 12th, 19th, 21st, 25th; Western Gulf States, 2nd, 7th, 8th, 11th; Lower Lake region, 4th, 13th, 16th, 19th, 23rd, 24th, 27th; Upper Lake region, 13th, 28th, 30th; Ohio valley and Tennessee, 1st, 7th, 8th, 13th, 28th; Upper Mississippi valley, 2nd, 7th, 10th, 11th, 12th, 13th, 14th, 15th, 24th, 25th, 27th, 31st; Missouri valley, 1st, 7th, 8th, 11th, 14th, 16th, 17th, 18th, 20th to 22nd, 24th to 31st; Western Plateau, 17th, 21st, 26th, 27th; California, 9th, 12th, 22nd, 27th; Washington Territory, 14th, 22nd.

## MISCELLANEOUS PHENOMENA.

**Sunsets.**—The characteristics of the sky at sunset, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service Stations. Reports from 131 stations show 4,042 observations to have been made, of which 32 were reported doubtful; of the remainder, 3,264, or 81.4 per cent., were followed by the expected weather.

**Meteors.**—Belvidere, Ill., 31st; New Corydon, Ind., 13th, 17th, 18th, 26th, 27th; Spiceland, Ind., 1st; Wabash, Ind., 15th, 11:30 p. m., a very large and brilliant meteor passed from SE. to NW., lighting up the whole heavens; Woodstock, Md., 7th, 12th, 13th, 15th, 16th; Westborough, Mass., 12th, 13th; Rowe, Mass., 7th, 9th; Ashley, Mo., 12th; Clear Creek, Neb., 2nd; Austin, Neb., 12th; Freehold, N. J., 16th; Atco, N. J., 17th; Waterburg and North Volney, N. Y., 13th; North Platte, 13th; Castroville, Tex., 11th; Pensacola, Fla., 1st, 10th, 19th; Springfield, Ill., 10th; Madison, Wis., 16th; Chambersburg, Pa., 12th; Ashwood, Tenn., 16th; Maiden Rock, Wis., 30th; Mr. H. H. Ten Broeck, reported the appearance of a remarkably brilliant meteor at 6:45 p. m. It was first observed about 37° above the western horizon moving in a southwesterly direction. It left a trail about 5° long equally dividid into yellow, scarlet and violet bands, lasting about ten seconds when suddenly changing into a yellow cloud it disappeared.

**Earthquakes.**—United States Naval Hospital, Yokohama, Japan, October 17th, 1879, 1:31 and 2:17 p. m., light shocks; 18th, 1:52 a. m., severe shock, duration 45 seconds; 25th, 0.40 a. m., light shock; 30th, 9.44 a. m., light shock; November 15th, 9.30 a. m., two smart shocks, duration 7 seconds. Two distinct shocks moving from west to east were felt at Charlotte, N. C., and in the surrounding country within a radius of 11 miles, the one at 7 p. m. of the 12th, and the other at 2 a. m. of the 13th. The second was sufficiently distinct to rouse from sleep persons living in Charlotte, Sharon township, Providence, and Pineville. At Los Angeles, Cal., slight shock at 8:15 p. m. of the 7th, lasting about two seconds.

**Zodiacal Light.**—Monticello, Ia., 8th, 11th, 13th. Cedar Vale, Kan., 11th, 12th, 13th. Yates Center, Kan., 5th, 6th, 10th, 11th, 12th, 13th. Rowe, Mass., 5th, 9th. Oregon, Mo., 13th. Clear Creek, Neb., 12th. Atco, N. J., 1st, 2nd, 12th, 13th. Cambridge, Mass., regularly looked for at 8 p. m.; suspected through haze on the 4th; somewhat visible 7th, 9th, 12th; observations on other evenings hindered by moonlight or clouds. Lynchburg, 30th, 31st. Southington, Conn., 15th. Wytheville, Va., 1st, 3rd, 4th, 6th, 7th, 8th, 12th, 16th.

**Prairie and Forest Fires.**—Creswell, Kan., 1st, 2nd, 3rd, 8th, 13th to 16th, 20th, 24th, 25th; Dodge City, 10th, 11th, 12th; Fort Sill, 3rd, 7th, 9th, 10th, 15th, 17th; Fort Gibson, 1st, 2nd, 13th, 17th, 26th; Henrietta, Tex., 3rd, 9th, 10th; New Orleans, 29th.

**Polar Bands.**—New Corydon, Ind., 5th, 13th, 18th, 27th; Tabor, Ia., 27th; Yate's Center, Kan., 2nd, 29th, 31st; Gardiner, Me., 8th, 13th, 19th, 28th; Clear Creek, Neb., 2nd, 20th, 27th; Freehold, N. J., 3rd, 28th; Vineland, N. J., 29th; Pembina, 3rd; Milwaukee, 22nd; Wytheville, Va., 7th, 12th, 27th.

**Mirage.**—Genoa, Neb., 10th, 12th, 13th, 22nd; Pembina, 5th, 11th, 18th, 22nd, 24th, 31st; Cape Lookout, N. C., 3rd; Macon, N. C., 3rd.

**Sun Spots.**—The following record of observations made by Mr. D. P. Todd, Assistant, has been forwarded by Prof. S. Newcomb, U. S. Navy, Superintendent Nautical Almanac Office, Washington, D. C.:—

| DATE—<br>Dec., 1879. | No. of new— |       | Disappeared by<br>solar rotation. |       | Reappeared by<br>solar rotation. |       | Total number<br>visible. |       | REMARKS.   |
|----------------------|-------------|-------|-----------------------------------|-------|----------------------------------|-------|--------------------------|-------|--|
|                      | Groups      | Spots | Groups                            | Spots | Groups                           | Spots | Groups                   | Spots |  |
| 1st, 8 a. m.         | 0           | 0     | 0                                 | 0     | 0                                | 0     | 1                        | 3     | } Faculae.   |
| rd, 9 a. m.          | 0           | 0     | 0                                 | 0     | 0                                | 0     | 1                        | 3     |  |
| 7th, 8 a. m.         | 0           | 0     | —                                 | —     | 0                                | 0     | 0                        | 0     |  |
| 7th, 10 a. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     |  |
| 8th, 4 p. m.         | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     | } Spots faint.<br>Faculae.   |
| 9th, 9 a. m.         | 1           | 3     | 0                                 | 0     | 0                                | 0     | 1                        | 3     |  |
| 12th, 9 a. m.        | 0           | 0     | —                                 | —     | 0                                | 0     | 0                        | 0     |  |
| 13th, 8 a. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     |  |
| 16th, 4 p. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     | } These 2 spots have had a large relative motion since<br>morning observation. |
| 16th, 8 a. m.        | 1           | 2     | 0                                 | 0     | 0                                | 0     | 1                        | 2     |  |
| 16th, 4 p. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 1                        | 2     |  |
| 17th, 3 p. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 1                        | 2     |  |
| 18th, 8 a. m.        | 0           | 2     | 0                                 | 0     | 0                                | 0     | 1                        | 4     |  |
| 26th, 8 a. m.        | 0           | 0     | —                                 | —     | 0                                | 0     | 0                        | 0     |  |
| 27th, 9 a. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     |  |
| 28th, 3 p. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     |  |
| 30th, 8 a. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     |  |
| 30th, 2 p. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     |  |
| 30th, 2 p. m.        | 0           | 0     | 0                                 | 0     | 0                                | 0     | 0                        | 0     |  |

Mr. Wm. Dawson, at Spiceland, Ind., reports "on the 5th, 2 small spots 6' from west edge; considerable faculae in SE. quadrant; air poor. 9th, 3 small spots near centre, much cloud. 16th, 3 small spots 5'

from east edge, air bad. 22nd, one moderate-sized spot 6' from west edge, air bad. 26th, no spots, too cloudy to observe well. 31st, 4 spots in one group about 7' north of centre." Mr. H. D. Govey, at North Lewisburg, Ohio, reports "observed two large sun spots on the 18th, at 9:15 a. m. Lewisburg mean time."

Mr. F. Hess, at Fort Dodge, Iowa, reports: "during the first week of the month, when a group of three or more spots should have been visible, the sun could not be observed on account of cloudiness. 17th and 18th, 10 a. m., one large double spot with penumbra and one small one in SE. quadrant. 19th, 11 a. m., one large and one small spot within a common penumbra and two small ones in SE. quadrant. 20th, 11 a. m., only one spot indistinctly visible, on account of haze, in SW. quadrant. 22nd, 9 a. m., one large spot in SW. quadrant. The sun was examined on all other clear days of the month but no spots noticed."

Mr. David Trowbridge, at Waterburg, N. Y., reports "sun observed on 7th, 9th, 12th, 13th, 16th, 26th, 27th and 28th, no spots. On the 18th, 3 p. m., a small spot about  $\frac{1}{2}$  diameter of the disc from the west margin; 18th, one group of two well defined spots about  $\frac{1}{2}$  diameter from east margin of disc; 19th, the two spots still visible; 21st, only one spot visible."

Prof. Hinrichs, at Iowa City, Iowa, "Sun spots were seen on the 1st."

At Fort Whipple, Va., observations were continued throughout the month, but no spots reported.

*Precipitation received after issue of November Review.*—*Washington Ty.*: Neah Bay, 8.78 inches; Fort Canby, 5.60; Bainbridge Island, 4.40; Walla Walla, 1.83; Fort Townsend, 1.50; Fort Colville, 1.03 in. *Oregon*: Fort Stevens, 8.68; Albany, 5.80; Fort Klamath, 5.78; Eola, 4.00; Fort Harney, 3.34; Umatilla, 0.61 in. *Idaho Ty.*: Fort Lapwai, 2.36 in. *Montana*: Fort Ellis, 0.30; Blackfeet Agency, 0.21; Forts Benton and Shaw, 0.06; Fort Logan, trace. *Dakota*: Fort Totten, 0.20; Fort Meade, 0.04; Fort Sully, 0.03; Forts Hale and Sisseton, trace. *Michigan*: Fort Brady, 2.12 in. *Iowa*: Clarinda, 3.68 in. *Wyoming*: Fort Fetterman, 0.26 in. *Colorado*: State Agricultural College, Fort Collins, 1.50 in. *Nevada*: Pioche, 0.08 in. *California*: Fort Gaston, 11.24; Oakwood Rancho, 3.61; Oakland, 2.98; Poway, 2.75; Campo, 3.00; Fort Bidwell, 1.75 in. *Arizona*: Fort Apache, 2.12; Burkes, 1.22; Florence, 0.79; Wickenburg, 0.00 in. *New Mexico*: Fort Wingate, 0.51 in. *Kansas*: Independence, 2.15 in. *Texas*: Fort Bliss, 0.01; Fort Ringgold, 0.00 in. *Florida*: Biscayne, 1.00; Okahumpka, 0.00 in.

*Mean Temperature* for Umatilla, Or., for November is  $37^{\circ}.6$ , or  $4^{\circ}.2$  below the average for several years; *maximum*  $61^{\circ}$  and *minimum*  $15^{\circ}$ ; prevailing wind-direction, SE.

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Albert J. Meyer

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